An

Essay on

The Modus Operandi of Colds

By

Samuel Mory

of Virginia

"

We think our fathers fools, so wise we grow;
Our wiser sons, no doubt, will think us so.

"

An Essay on Cold

For a few years past, there has been much controversy in opinions with respect to the modus Operandi of Cold; one party believing that it acts as a stimulant to the animal machine, & prescribing it for its stimulating power in the Treatment of diseases; while another party, considering it as a sedative, employs it with intentions diametrically opposed to the former, & in Diseases very dissimilar in their natures or stages. As no correct Practice can result from principles & intentions so discordant, it becomes an object of the first importance in the Science of Medicin, that the Truth be investigated & soon detected, since Cold in its various modes of application & exhibition forms such an important & useful article of the Materia Medica, when correctly administered. It must be evident to every person, that if it is a stimulant, it must be an improper remedy in diseases of great morbid action of the arterial System; & if a sedative, an improper & deleterious remedy in diseases of weak morbid action. Therefore that we may know when it will be beneficial, and when detrimental, we should be acquainted with its mode of Operation.

The first question then which would naturally

proposed

present itself to our minds, is, whether Cola is a Stimulant or a Sedative? I shall answer that it is a Sedative.

As much Confusion, & difficulty of comprehending a Writer's meaning, have arisen from the ambiguity of the terms which he may use, I shall define Stimulants nearly in the language of Dr. Barton, to be any substance, property, quality or circumstance which increases the frequency & force of the Circulation, the heat of the body & nervous energy by a direct action. By Sedative, I mean any substance, property, quality or circumstance which directly reduces or diminishes the effects of Stimulants, that is to say, reduces the force & frequency of the Circulation & diminishes or attracts the heat of the body; or in other words, any thing which can abstract stimulis, or is a direct depletive. I allude to what have been denominated the direct Sedatives & confess that there are many substances which will produce the above effects in a secondary or indirect manner.

Stimulants have been defined by several Authors to be any substance which produces Motion, Sensation & thought; & that any thing which produces Motion, Sensation, and thought, is a Stimulant. If they had included in their definitions, that these effects must have been produced by a direct or primary action, I could have

subscribed

submitted to it; but the definition as it stands, is too general, ambiguous & indefinite, & I might have added, incorrect. It has in my opinion, laid the foundation of much error & has afforded a principal argument to the advocates of the stimulating power of cold. If the above definition was to be allowed, there would be no such a thing in nature as a direct sedative; for where is the sedative when extended to a certain degree, that does not produce motion, sensation or thought?—

Every one will admit that bloodletting is a direct sedative, & produces sedative effects upon that animal from which the blood is abstracted; but who is so ignorant as not to know that if it be extended to a certain degree, that it will produce the most powerful motion, & we have every reason to believe sensation of the most disagreeable nature? The correctness of this remark is strikingly illustrated in animals which are bled to death. We first observe the force of the circulation to be diminished, the general strength to fail, but then succeeded by violent & convulsive motions & doubtless the most painful sensations. These are all the effects of the want of the natural stimulus of the blood.

Who has not observed the most disagreeable sensations experienced by those who have been bled only to such an extent as to produce syncope, or

who

who has not experienced Tremulous the most unpleasant sensations, from the loss of such a quantity of blood as to produce fainting? No one will hesitate in saying that the above mentioned sensations were not produced by the direct action of a stimulant.

Again if an animal be placed under the receiver of an air Pump, & the air be exhausted, we shall obtain the same effects as just mentioned from the loss of blood; yet no one will deny that the Atmospheric air is a Stimulant to the living animal or that its abstraction or diminution is a relative or abstraction of stimulus.

The food which we daily receive, affords a large portion of the Stimulus necessary for the Animal economy;— It is certain that if the quantity or quality of this be diminished, its effects must be diminished in the same ratio, that is to say, that nutriment is a cause or relative to the animal system in reducing the force of the circulation, the heat of the body &, in proportion to the degree of the retirement. But if this retirement be extended in degree or becomes what we call, fasting, we shall find that a morbid excitement will take place, the whole system for a short time possessing increased strength, and

and accompanied with the most painful sensation. The pain of Hunger is so severe, that it is said to submit to no Laws nor yield to no restraint. It is a familiar observation of military character, that the greatest cowards become brave men by fasting. The strength of the lion is said to be much increased by hunger, & becomes more ferocious.

Is it not reasonable to conclude that the sensation & ill uses from the application of cold, are produced in the same manner from a deficiency of Stimulus, when we reflect that cold is only the removal or deficiency of heat, or a greater capacity for heat, & that heat itself is a stimulant. The same phenomena take place with respect to every other sensation in nature if they be continued long enough. ——

From the above facts we see that irritation & sensation are as much the effects of a deficiency of the natural & healthy quantity of Stimulus, as they are of the direct action of Stimulus. It would appear from hence, that the Animal economy required a certain proportion or quantity of stimulation for the performance of its healthy operations, & that an excess or deficiency of Stimulus are equally deleterious, & equally productive of morbid actions.

It must not be understood that I think they produce these effects in the same manner; but while the stimulants produce motion & sensation by a direct & specific action, they and narcotics by acting in an indirect way, or by a want of any peculiar or specific action of their own. For instance, when a large quantity of blood or any other nutrient stimulus is abstracted from the Body, the motion & sensation being excited by a deficiency of stimulus, or to use the words of Dr. Leigh, are produced by the nerves being diverted from their natural action by a deficiency of Stimulus. In this manner, I think it is evident, that a great degree of cold, or any other relations, produces motion & sensation, & have consequently been considered stimulants, when in fact the sensation & motion are the effects of a want or deficiency of stimulus. As the blood in this above case is undoubtedly a stimulus to the different parts of the body, so in proportion to its abstraction must the stimulation or excitement of the system which is produced by it, be diminished, & consequently the motion & sensation which are thus produced, cannot possibly be the effect of stimulants.—

I have said above that sedatives were abstract-
ors of stimulus, or direct sedatives, & shall now say
that I believe that they all are negative agents,
properties or qualities, & produce no specific actions of
their own, by acting upon the excitability as stim-
ulants are supposed to do. Venesection, Abstinence,
cold &c. which are acknowledged to be sedatives,
produce no positive or specific action, but act
negatively by abstracting stimulus from the body & thus
diminishing or removing the excitement in proportion
to the above abstraction.

We know that cold is only the absence, or abstrac-
tion of heat & consequently a negative property or pow-
er & can possess no positive action of its own, but
must act negatively only, by abstracting or diminishing
heat & thus remove the effects of heat, or exhibit
effects contrary & different from those of heat. If
heat be a stimulant (which is admitted by everyone)
cold or the absence or abstraction of heat, must be a
sedative & manifest sedative effects in proportion
as it diminishes the stimulating effects of heat, by
abstracting the stimulus heat itself. That I may
be ~~[illegible]~~ more clearly understood, suppose that
90 degrees of heat be applied to the system &
produce 40 degrees of excitement; now if 45 de-
grees of cold be applied, or the heat more cor-
rectly

=rectly speaking. be reduced 45 degrees, the ex=
tremities must be reduced in the same propor=
tion that is to 20 degrees, & so in proportion to
the reduction of the heat or the application of
the cold. will be the reduction of the ex=
tremities.

To obtain a correct knowledge of the operation of
Cold. I think it would be sufficient only to take
a view of vegetation in the winter & the Spring.
what causes the lifeless appearance of vegitation in
winter, & what the lively verdure of Spring? — no
one will pretend to say that the former is caused
by the diminutive operation of Cold, or the lat=
ter by the excessive power of heat. the daily
we life exhibited in vegitables in its most perfect
& vigorous state, by means of a stove room or a
warm house, in the winter season, when there
are not the smallest symptoms of vegitation
in similar plants which are exposed to the
colds of the winter.

If the branch of a Tree should find its way
into a stove room while the whole tree is in
a vigorous & lively state with respect to growth
& vegitation in the warm season, it will re=
main in this state for a considerable length
of time after every other part of the Tree exhibits
not

not a single sign of vegetation in consequence of the winter's cold. Or should this branch be introduced into a warm House room in the midst of winter when there was not the small- est sign of vegetation in any part of the Tree, we don't find that the branch will ever vege- tate & become as green as it is in the midst of Spring, when the rest of the tree which is left at- tach'd to the Tree remains in the same con- dition as before it was severed from the Tree & the warm house room. Likewise when vegetation is in a vigorous state as the process of evaporation, if the temperature of the atmosphere be considerably diminished, tho' no frost ensue vegetation is immediately checked, & if the cold be continued for a short time, they will become pale & languid. This fact must be familiar to every one, & the cause must be as plain & as evident as the fact is familiar.

From the above facts, I think it is incon- testably proved, that cold cannot emit any flow- ering flower upon vegetables; but where is the line of distinction between vegetables & animals? I believe that naturalists & physiologists gen- erally agree that they possess the same kind of life, & that differ only in degree or quantity. If this

This opinion be correct, the most natural & correct influence would be, that Cold must exert a similar influence over Animals as over vegetables & consequently Cold, must be a stimulant to Animals as it is unquestionably not to vegetables.

Let us next take notice of two of the effects of Cold when applied to different parts of Animals. We observe the following Phenomena in the hibernating Insects, Animals & which take place with respect to vegetables in the different Seasons. They possess life in its most perfect & active state in the warmer Seasons, but gradually become more inactive & torpid as winter approaches, till most a Cessation of life remains. If in this torpid & apparently lifeless State, they be exposed to a moderate heat & this gradually increased, they will become reanimated, & in a short time possess life as active & as vigorous as they did before their State of hibernation. But if on the other hand, they be suddenly exposed to a great degree of heat, that life which they possessed in a Calm State will certainly be destroyed. It is evident that the Cold of the winter is the cause of this torpidity, & the Animal heat is naturally the cause of the succeeding activity. God in producing this State

of

of torbor, must either do it by exhausting the excitability by means of its excess of stimulating power & leaving the system in a nonexcitable or stricture state, or must act as a sedative by abstracting the necessary & natural stimulus of heat, & consequently excitement, & leaving the system in an excitable or lessened state. If it were in the former way, it is plain that it would require a larger portion of stimulus to excite it, or to convert into excitement the remaining small portion of excitability; but contrary to this we know that if a great degree of heat be applied, we run a risque of destroying the life of the insect, or animal to which it is applied.

A fact stated by Dr Rush in the course of his Lectures goes far to prove that cold is not a stimulant to horses, to wit, 'it is ascertained by experiments & is a fact familiar to the Farmers of this Country, that a horse requires 6 pounds of Hay more in 24 hours in an open & cold stable in the winter than he does in a stable that is close and warm. A certain quantity of stimulus is always necessary to be acting upon the system for its well being, & if cold were a stimulant, the more severe it was, the less food should be necessary to keep the system at its proper point of excitement.

Do we not observe the same thing to take place in the Inhabitants of Cold & Northern climates? They use a larger quantity of the most stimulating animal food & Spirituous & fermented liquors, than the Inhabitants of temperate & Southern Climates. The same thing is observed in warm & temperate climates in the different seasons. Is in proportion to the Coldness of the season in warm Climates, & the severity of the cold in northern Climates, do we find we food & drinks more stimulating. Does this not arise from a deficiency of this = ulus; & if Cold was a stimulant, would not the quantity of stimulating food & drinks be necessa = rily diminished in the same ratio in which the vitality of the Cold was increased?—

What is the cause of that difference of time which takes place in the appearance of the Catamenia in warm & Cold Climates? We have every reason to believe that in proportion as the Female has been under the influence of stimulating Passions, con = cupiscence, so &, and in proportion to the warmth of the Climate, so much sooner as the Catamenia make their appearance. As every thing which ex = cites repeatedly & uniformly the System, has a ten = dency in the same ratio to accelerate the ap = pearance of the Catamenia, under similar cir = cumstances

Mr. Wm. La

Jeremiah

The

Jos

= constitution as to health, &c. In proportion to the degree of cold in any climate, (cæteris paribus) is the Catamenia retained in making their appearance. Should Cold then in this case be considered as a stimulant or a seda= tive ?—

If the hand be exposed to cold for some time, & if a ball of snow or ice be applied to it, & if after a few minutes the hand then be sud= denly exposed to a degree of heat which would have been comfortable before the application of the cold ; a Great excruciating & burning pain will be experienced. If the cold be increased, or its ap= plication longer continued, & the hand then be ex= posed to a greater degree of heat, besides the above mentioned symptoms, the part will be in addi= tion of losing its life & sloughing off, or be inc= cased by a great degree of inflammation. But if the hand thus exposed to cold, be plunged into cold water whose temperature is only a few degrees greater than that of the cold to which the hand has been exposed, & if the temperature then be gradually increased, the life of the part will thus be saved, & the pain will be very trifling. It is evident that the excitability in this case is greatly accumulated, & that very gentle stimulants should be applied to prevent violent morbid action, or new Inflamation

+

a death from taking Cold; hence the treatment in Fever cases. If Cold in the above case had acted as a Stimulant, the excitability would have been exhausted instead of having been accumulated. The pain of the Head which is experienced from exposing it to heat after a previous application of Snow or Ice, appears to me to arise from a temporary & local Rheumatism of the Scalp. If Cold be a Stimulant. How shall we account for the frequency of Pneumonia, Catarrh & other acute & inflammatory diseases in the months of Spring, or from sudden changes of the weather? If the Room be exposed for some time to such a degree of Heat as it can conveniently bear, & then be instantly plunged into Cold water, we shall have more of the Symptoms as above mentioned, in a very small degree.

Suppose a person to be in a room which has temperature of such a degree as to be most agreeable to the person, to promote the excitement of the natural & healthy Standard, & having recently undergone an abstraction; let the temperature of the room be gradually reduced to such a degree that the life of the patient should be lost by his freezing; what would the Phenomena exhibited from the first, reduction of the ~~Temp~~perature of the room, till the death of the person? The natural excitement of the arterial sys-

tem

=tion would be reduced, the heat of the body di=minished, & the whole vital energy finally exhausted. We shall find no increase of excitement through this whole course, not a solitary symptom of a preter=natural quantity of stimulus acting upon the sys=tem. Suppose that after this cold had been considera=bly increased, it should be suddenly reduced or abstracted, what would then take place? the excitability being ac=cumulated by a deficiency of stimulus, the natural heat of the room would then act as a powerful stimulant, the pulse would become excited, the heat much increased, & the skin would assume the inflammatory blush. This must have been observed by every one in a self-ex=ence, who after exposing his face in walking to the wind in cold weather, suddenly turns his back to it, or enters a warm room. All stimulants wisely applied suddenly & excessive in quantity or quality (in which case immediate prostration or death may be produ=ced) increase the force of the arterial system & heat of the body; but we know that cold produces nei=ther of these effects, though it be increased from a very moderate to such a degree as to become ex=tremely painful. This is proved by many experiments which have been made for that purpose, but which are needless for me to relate. If cold directly act as a stimulant primarily, I think it is difficult to conceive how any person could freeze to death; before this could happen, the degree of

cold

Cold would certainly arrive at such a point as to be a great stimulant, & would thus increase the arterial excitement & consequently the heat of the body, & thus prevent the person from freezing. But the contrary of this, I believe always takes place, the sudden application becomes more weak & painful as long as the cold is applied & the heat gradually diminishes until the unfortunate victim is unfitted by the frozen arms of death.

From the action which takes place in the tubes in cases of inflammation, it has been inferred that cold may stimulate, but one of the strongest arguments in favour of its stimulating power of cold, for any thing which has a tendency to increase, instead of diminishing or retarding the quantity of stimulus, has a direct tendency to render this disease more fatal & difficult of cure. I feel cautious in saying, that in a fit of asphyxia no one could with safety make use of stimulating remedies to awaken his patient to a sense & cold water. If then cold be an useful remedy in such cases, it must act by abstracting such a portion of stimulus as to permit the system to reach & this by any stimulating action of its own.

Cold in some form or other has long been employed as one of the best remedies in local inflammations; when we would wish to check or stop the inflammation & prevent suppuration, I think we would not

wish to

make use of stimulating applications. If cold is a Stimulant, I must confess that I am ignorant of the intention with which it is used in these cases.

The excruciating pain, high delirium, restlessness, & watchfulness of Phrenitis, are often relieved in a short time by cold applications to the head, or even by shaving the head, which has been obtained;— It is usual in addition to the younger Medical Students, that they shave which Stimulates has a tendency to increase the disease, & that bloodletting, cold applications to the head, & every other expedient, are the proper remedies for it. But if cold acts as a Stimulant in this case, it must be admitted that it acts entirely different from any other Stimulant with which we are acquainted.

In the inflammatory fevers, as Small Pox, Measles, Rheumatism &c. cold in some shape or other is an invaluable remedy; but I would mention to you that we use at this time would think of using Stimulants in the inflammatory stages of these diseases. But many Practitioners must have experienced the beneficial & salutary effects of cold in fevers diseases of an inflammatory type.

The pain produced & arising from the application of cold, has been considered as a strong argument in favor of the Stimulating power of cold, but from what I have said above, I think it

is

is evident that pain may arise from a deficiency as well as from an excess of stimulus, or to use the words of Dr. Rush. that "the nerves are diverted from their proper action by an abstraction of their proper stimulus & thus produce pain, in the same manner as we have seen arise from profuse blood letting.

Query. We know that heat always tends to an equilibrium, & that when cold has been applied to an external part its temperature is diminished & its excitability accumulated; May not the internal heat having a tendency to an equilibrium, fly to this external part whose heat has been diminished & then acting upon its accumulated excitability, produce pain in the same manner as heat externally applied?— This opinion derives some probability from pain being caused by such a degree of cold as is capable of suddenly reducing the heat of the part to which it is applied, or its application being so long continued as to destroy the equilibrium of the surface & the more internal parts; & that the pain ceases after the application of the cold has been continued long enough to bring the external & internal parts nearly to an equilibrium. That the cessation of pain does not depend upon an exhaustion of sensibility & excitability is evident from

the

the same acute pain which is caused by approaching near a fire. This has been often noticed in cases of frost bites.

It is said that the flow of tears caused by the application of a ball of snow to the eye, is a proof of the stimulating power of Cold. The pain arising from the snow, may for a short time cause a small increase of the secretion of the tears; but as we know that the whole external surface of the body is contracted by cold, the mouths of these absorbents opening externally must partake of this general contraction, which together with that state of torpor which must arise from such an abstraction of their proper degree of stimulation, & consequently a smaller quantity of fluids must be absorbed. Thus the tears overflowing the cheeks in consequence of the contraction & inactivity of the puncta Lacrymalia, give the appearance of an augmented quantity of tears; but that this is not owing to an increased secretion & action of the Lacrymal gland, is inferred from all other glands having their actions relaxed or diminished by cold, instances the late period in which the Catamenia make their appearance & the small quantity secreted at a time in cold climates. by experiments of all kinds it is found that perspiration is retarded by Cold, & the secretion of the Urine is performed with difficulty

in

Cold weather. Cold, for a few years past, has been much used by several Physicians in Europe in Typhus Fever, & has afforded a strong argument as thought by some of the stimulating power of cold, but I think militates against the opinion which it was intended to support. In what state of Typhus fever is cold used, & in what manner is it employed? It has been thought most beneficial when the skin was hot & parched. It must be evident to every one that the application of cold to the skin in this case must depend upon an increased & morbid excitement; now if this excitement can be translated to the artificial system by a powerful remedy, we shall obtain the same effects as by giving large doses of stimulants internally. With this intention cold water has been used, hence the necessity of the application of cold being confined a very short time in Typhus fever. If cold is a stimulant, why is cold water used only in the manner of affusion in Typhus fever? if it was a stimulant, would it not be better to let the patient bathe for an hour or two in a tub of cold water, or if this method was inconvenient, to make cold applications to the extremities for some length of time, for we know that the most powerful stimulants are most useful in Typhus fever. If it is continued for a considerable time

the

general excitement of the system would be the consequence. From this it appears that the merely stimulating effects of cold, as long as the application of the cold is continued in this manner. It is only after the application of the cold has been discontinued & the system has time to react, that the cold takes on its secondary effects of opium.

From similar effects being produced by cold and certain stimulants, cold has often been supposed to be a stimulant; but these similar effects have been produced under the system has been in very dissimilar circumstances or different conditions; for instance, the cold bath & opium both increase perspiration, & as opium is known to be a stimulant so must be the cold bath as it produces the same effects as opium. But when we know that these similar effects are produced in dissimilar states of the system, it must be evident that they produce these similar effects by a dissimilar mode of action. We know that cold produces this effect only when the system is reacted above par considerably; & I can venture to say that no one would give opium or any other stimulant to produce or promote sweating, when the system

was much excited. If we are to condemn this two articles possess the same properties from producing similar effects, Bloodletting & opium should be classed together, for they both cause pain, promote sleep & perspiration & increase the force of the arterial action; but if they produce these effects in dissimilar states of the system, can we have a doubt but they act dissimilarly? — I think it is a correct axiom in Medicine, that if different substances produce similar effects under similar conditions, circumstances, or states of the system, that their powers, properties or qualities are similar, & vice versa. We know that Opium & venesection produced similar effects under very dissimilar circumstances, & that Opium is a Stimulant, therefore venesection must be a sedative. But Coca & venesection both reduce the activity of the pulse when not depressed, give activity to the pulse when depressed, increase perspiration & prove a stop to hemorrhages when the arterial system is excited; thus under similar circumstances we find that similar effects are produced by venesection & Coca. We know that venesection is not a Stimulant, consequently Coca cannot be a Stimulant. Does Opium or any other Stimulant produce any one of the above effects under the same state of the system? —

Coca is said to give strength & vigor to the body,

body; does it owe as it ought the system has been supposed by heat? & does it not thus as it only by attracting a portion of the superabundant stimulus of heat which debilitates the system & thus suffers it to react?-

The various accounts of the benefit derived from cold in the most inflammatory diseases, leave no room to doubt of the sedative power of cold. How do the advocates for the stimulating power of cold account for the beneficial effects of Cold in these inflammatory diseases? They say, "when employed as a remedy in these diseases, Cold though a direct stimulus to the skin to which it is applied, acts indirectly as a sedative to the arterial system. First, it transfers to the skin somewhat on the principle of blistering plasters, a degree of excitement which the organ else not before possess: & secondly, it acts the part of a vacuum. For it is the genuine vacuum of heat of which there is a preternatural & morbid accumulation in the systems of those laboring under pestilential diseases. Its evacuation, therefore, or removal from the system, must be attended with a sedative effect."

If the removal of the heat of the system be attended with sedative effects, must not whatever removes the heat be a sedative?- That in pestilential & highly inflammatory fevers is a great irritant to the system, & though itself be the effect of the morbid action of the system, it becomes an irritant & keeps up